DOCUMENT RESUME

ED 332 397 EC 232 119

TITLE	Computer Assisted Instruction for Students with Mild Handicaps. Abstract 27: Research and Resources on Special Education.
INSTITUTION	ERIC Clearinghouse on Handicapped and Gifted Children, Reston, Va.
SPONS AGENCY	Office of Special Education and Rehabilitative Services (ED), Washington, DC. Div. of Innovation and Development.
PUB DATE	Jul 90
CONTRACT	400-84-0010
NOTE	3p.; For a related document, see ED 324 833.
AVAILABLE FROM	Council for Exceptional Children, Publication Sales, 1920 Association Dr., Reston, VA 22091-1589 ($1.00 each, minimum order of $5.00 prepaid).
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Computer Assisted Instruction; Drills (Practice); *Instructional Design; *Instructional Effectiveness; *Mild Disabilities; Simulation; Videodisks

ABSTRACT

The research summary is based on studies reported in "Computer Assisted Instruction in Higher Order Skills for Mildly Handicapped Students: Programmatic Research on Design Principles" by Douglas W. Carnine. Overall, results indicated that well-designed computer-assisted instruction (CAI) can be an effective instructional medium for students with mild handicaps. Four types of CAI--drill and practice, simulations, tutorials, and videodisc--were investigated within the context of four stages of instruction--introduction, modeling, guided practice, and independent practice. Instructional principles examined included: size of teaching sets, cumulative review, explicit strategy teaching, discrimination practice, and elaborated correction. Among findings of specific studies were: shorter vocabulary lists led to faster total mastery; computer-based simulations used for review and practice were more effective than conventional instruction in providing students with practice solving health problems; elaborated feedback (showing student all steps necessary to arrive at the correct answer) was more effective than simple corrective feedback in improving generalization and transfer of new knowledge; direct teacher instruction appeared necessary for tasks combining verbal and mathematical reasoning (e.g., math story problems); and videodisc instruction was highly effective in teaching fractions. (DB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ERIC CLEARINGHOUSE ON HANDICAPPED AND GIFTED CHILDREN

ERIC/OSEP SPECIAL PROJECT ON INTERAGENCY INFORMATION DISSEMINATION

RESEARCH & RESOURCES ON SPECIAL EDUCATION

ABSTRACT 27
JULY 1990

ED332397

COMPUTER ASSISTED INSTRUCTION FOR STUDENTS WITH MILD HANDICAPS

A series of studies recently conducted at the University of Oregon applied instructional design principles to computer assisted instruction (CAI), explored the respective roles of the teacher and the computer, and looked at how CAI can best be used at various stages of instruction for students with mild handicaps. The studies are reported in *Computer Assisted Instruction in Higher Order Skills for Mildly Handicapped Students: Programmatic Research on Design Principles* by Douglas W. Carnine. Results indicated that well-designed CAI can be an effective instructional medium for students with mild handicaps.

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Four types of CAI--drill and practice, simulations, tutorials, and videodisc--were investigated within the context of four stages of instruction--introduction, modeling, guided practice, and independent practice. Drill and practice CAI was effective in teaching vocabulary, which requires considerable practice but does not vary much as instruction moves from one stage to the next. For a more complex subject (health), findings indicated that when the teacher taught facts and concepts, computer simulations could be effective for guided and independent practice. For reasoning skills and fractions, CAI tutorials were found to be effective alone. However, for math word problems, a stand-alone tutorial was not effective; it was suggested that if teacher-directed instruction is provided first, the computer may be useful for guided practice.

The instructional principles examined were (a) size of teaching sets (the number of items taught in one lesson), (b) cumulative review (presenting recently taught skills frequently in subsequent lessons), (c) explicit strategy teaching (providing the student with specific rules for problem solving), (d) discrimination practice (practice in identifying different types of problems, such as those that must be solved by addition *vs.* by multiplication), and (e) elaborated correction (providing an overt model of the steps necessary to solve a problem instead of simply telling the student the right answer).

SHORT LISTS LEAD TO FASTER MASTERY

The first study used drill and practice programs to examine the effects of the size of daily teaching sets on acquisition and maintenance of word meaning. Pretest scores were used to match 24 high school students with mild handicaps, who were then randomly assigned to one of two CAI programs. The programs were the Small Teaching Set Program (STS), which uses teaching sets of 7 words or fewer, and the Large Teaching Set Program (LTS), which teaches in sets of 25 words. Both programs presented the same 50 words and definitions. The students worked individually 20 minutes a day for 11 days. A 50-item multiple choice test was administered after 7 sessions, immediately after mastery or at the end of 11 sessions, and 2 weeks after mastery. Transfer measures included a 10-item objective test and a comprehension test. More subjects in the STS group met mastery, and they met mastery in significantly less time. The group achieved equivalent levels of performance on the multiple choice test, and no significant differences were found on the transfer measure.

SIMULATION IMPROVES REVIEW AND PRACTICE

This study compared computer-based simulations to resource room practice in health problem solving. Thirty high school students with mild handicaps were randomly assigned to either the conventional instruction group, which received structured group teaching followed by instruction in the resource room; or the simulation group, which received the same structured teaching followed by work in the computer lab. Instruction lasted 40 minutes per day for 12 days. Students were assessed 1 day, 2 days, and 2 weeks after instruction. Results showed a significant difference favoring the simulation group in (a) test items that were reinforced in the simulation and (b) prioritizing skills. These results indicate that simulation is an effective vehicle for reviewing items already presented in the written curriculum.

EC 232119

The Council for Exceptional Children operates the ERIC Clearinghouse on Handicapped and Gifted Children under a contract with the Office of Educational Research and Improvement, U.S. Department of Education.

BEST COPY AVAILABLE

ELABORATED FEEDBACK IMPROVES GENERALIZATION AND TRANSFER OF KNOWLEDGE

This study compared corrective feedback, which lets the student know the right answer without providing further information, and elaborated feedback, which shows the student all steps necessary to arrive at the correct answer. Twenty-eight junior high students with mild handicaps were randomly assigned to either a basic correction or elaborated correction group. The elaborated correction group used the Reasoning Skills Program, which teaches students (a) to draw conclusions from two statements of evidence and (b) to determine whether a three-statement argument is logical or illogical. The basic correction group used an altered version of the program that limited feedback to the correct answer. The students worked individually on microcomputers until they completed five lessons. Measures included two forms of the *Test of Formal Logic*. Form A was used for the pretest and also as a maintenance measure 2 weeks later. Form B was used as a posttest immediately following instruction. An item transfer test evaluated students' ability to generalize what they had learned. Results significantly favored the elaborated correction group on the post- and maintenance tests. There was also a significant difference favoring the elaborated correction group on the transfer test. There were no significant differences found for time used per lesson.

DIRECT TEACHER INSTRUCTION IS NEEDED FOR TASKS THAT COMBINE VERBAL AND MATH REASONING

This study investigated whether students could learn to solve math story problems if they were given an explicit strategy for choosing the correct operation. Twenty-six junior high students with mild handicaps were randomly assigned to either a program that provided an explicit strategy or a program that used a more general strategy of manipulating units. Each student worked at a computer 15 to 30 minutes a day for 11 days. Measures included a pretest and a posttest including 7 items that tested transfer of knowledge. Results showed no significant differences between groups' posttest scores or the amount of time used to take the test. Mean performance for both groups was not educationally significant. The authors suggest that for this type of complex academic task, teacher instruction with computer-guided practice may be more effective than computer instruction alone.

VIDEODISC IS HIGHLY EFFECTIVE IN TEACHING FRACTIONS

This study compared a traditional program for learning fractions with a videodisc curriculum that incorporates discrimination practice, cumulative review, and explicit strategy teaching. Subjects were 28 high school students, including 17 mildly handicapped students. The students were matched and then randomly assigned to treatments. During the 10-day intervention, observers collected data on levels of treatment implementation and student on-task behavior. A criterion-referenced posttest and 2-week maintenance test were administered. The videodisc curriculum resulted in significantly higher posttest and maintenance scores. Levels of on-task behavior were significantly higher in the videodisc sessions, although levels under both conditions were above 80%. Analysis of student error patterns indicated that differences in instructional design features contributed to the relative effectiveness of the two curricula.

Final Report, Computer Assisted Instruction in Higher Order Skills for Mildly Handicapped Students: Programmatic Research on Design Principles. Douglas W. Carnine, University of Oregon. 150 pp. U.S. Department of Education grant no. G008400660-02. October 1, 1987. Available approximately December, 1990, for $ .86 (microfiche) or $10.15 (hard copy), plus postage, from ERIC Document Reproduction Service, 3900 Wheeler Ave., Alexandria, VA 22304 (1-800-227-3742). EC number is 231 835. ED number is not yet available.

The ERIC/OSEP Special Project on Interagency Information Dissemination is designed to provide information about research in special education, in particular, research funded by the Division of Innovation and Development, Office of Special Education Programs, U.S. Department of Education. This product was developed by the ERIC Clearinghouse on Handicapped and Gifted Children under contract No. RI88062007 with the Office of Special Education Programs, U.S. Department of Education. The content, however, does not necessarily reflect the position of the U.S. Department of Education and no official endorsement of these materials should be inferred.

ERIC

ERIC/OSEP SPECIAL PROJECT
ERIC CLEARINGHOUSE ON HANDICAPPED AND GIFTED CHILDREN
THE COUNCIL FOR EXCEPTIONAL CHILDREN
1920 ASSOCIATION DRIVE, RESTON, VA 22091